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Office of Technical Assistance
Executive Office of Environmental Affairs
Commonwealth of Massachusetts

Toxics Use Reduction Case Study

REFORMULATED COATING AT HAMPDEN PAPERS REDUCES METALS IN SEWAGE SLUDGE

SUMMARY

Hampden Papers, Inc., reformulated a brass-based coating used on paper products and eliminated its copper discharges from this coating application. The Holyoke, Mass., company avoided both potential U.S. Environmental Protection Agency fines of \$5,000 per day per violation, and an alternative solution — construction of a \$250,000 to \$500,000 waste treatment plant.

BACKGROUND

Hampden is a 113-year-old specialty manufacturer of converted paper, film, foils and boards. The company employs 180 workers and has 64 production machines in a 300,000 square foot facility. Its printed, coated, laminated and embossed products are sold in more than 80 markets.

In one operation, 15,000 to 20,000 pounds per year of a brass-based coating chosen for its aesthetic qualities was applied by gravure and air knife coating machines. The wastewater generated during cleanup of these machines contained copper above allowable limits and was discharged to the Holyoke POTW (publicly owned treatment works).

At the Holyoke POTW, copper and zinc (components of brass) precipitate out in the sludge. The sludge is analyzed periodically for toxic metals (copper and zinc are two of the metals tested for), to insure that the levels meet state requirements and to classify the sludge. Type 1 sludge can be used for beneficial agricultural applications (due to the low metals content), and disposal is relatively inexpensive. The higher copper content — which Holyoke could positively attribute to Hampden Papers (see table) — meant the facility could have been forced to landfill the sludge as Type 3 sludge at substantial additional cost, which would have been passed back to Hampden. Hampden, as an alternative, could have installed its own treatment system to precipitate metals from washwater at a cost of \$250,000 to \$500,000.

TOXICS USE REDUCTION PLANNING

Ken Scott, Vice-President of Research and Development, quickly realized that the benefits of using the brass-based coating were offset by the added costs about to be imposed by the POTW. He began an effort to reformulate the coating with a program of laboratory experimentation and production testing that resulted, five months later, in the introduction of a mica-based alternative.

TOXICS USE REDUCTION MODIFICATIONS

Hampden's substitution of a mica-based coating for a brass-based coating had a dramatic effect

on sludge toxicity numbers. Prior to the change, the sludge at the POTW averaged 1090 parts per million (ppm) of copper; after the substitution, copper now averages 703 ppm. Sludge with less than 1000 ppm copper content is classified Type 1 and can be used in land applications.

While product quality has not been affected by introduction of the new coating, chemical costs were initially 60 percent greater. Hampden is continually refining the formulation and has reduced the differential to 20 percent.

RESULTS

Reductions Achieved: Type 3 sludge is a hazardous waste that must be landfilled in 55 gallon drums. In addition to filling large amounts of limited landfill space, burial would also pose long term liability concerns for both the POTW and Hampden Papers. On the other hand, Type 1 sludge can be used as compost. Hampden's reformulation means the sludge can now be used in a beneficial manner, providing compost for agricultural needs. Over 31 million pounds a year of sludge will not be landfilled.

Economics: If the POTW had been required to landfill Type 3 sludge, the added cost would have been a \$17 per ton tipping fee — \$265,000 — for the nearly 16,000 tons generated annually.

The cost to Hampden, had the company opted to install a waste treatment system, would have been \$250,000 to \$500,000. Hampden would also have had additional annual costs for labor, overhead and hazardous waste disposal. Thus, although the new coating has increased production cost, comparison of total costs more than justifies use of the mica-based coating.

Metals Loading Data

Hampden (effluent)		Holyoke POTW (sludge)		Hampden Reformulates 4/92			
Date	Cu (mg/L)	Date	Cu(mg/kg)	Date	Cu(mg/L)	Date	Cu (mg/kg)
10/90	18	8/6/91	1200	4/23/92	.78	4/27/92	730
11/90	68	8/26/91	1100	4/28/92	1.2	4/28/92	740
1/91	68	9/9/91	940			4/29/92	670
10/91	9.9	9/10/91	980			4/30/92	690
		9/11/91	990			5/1/92	690
		9/12/91	1000			5/2/92	680
		9/13/91	1000	5/4/92	.35	5/4/92	610
		10/25/91	1200	6/3/92	.38	6/5/92	680
		3/20/92	1400	7/1/92	1.5	7/17/92	700
		avg.	1090	8/3/92	.56	8/26/92	750
				8/13/92	.53	8/27/92	770
						8/28/92	770
						9/29/92	730
						avg.	703

This Case Study is one of a series of such documents prepared by the Office of Technical Assistance for Toxics Use Reduction (OTA), a branch of the Massachusetts Executive Office of Environmental Affairs whose mission is to assist industry in reducing the use of toxic chemicals and/or the generation of toxic manufacturing byproducts. OTA's non-regulatory services are available at no charge to Massachusetts businesses and institutions that use toxic chemicals. For further information about this or other case studies, or about OTA's technical services, contact: Office of Technical Assistance, Executive Office of Environmental Affairs, Suite 2109, 100 Cambridge Street, Boston, Massachusetts 02202, (617) 727-3260, Fax - (617) 727-3827.

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